MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

Permitting and Compliance Division
Water Protection Bureau
P.O. Box 200901
Helena, MT 59620-0901

Permit Fact Sheet
Montana Ground Water Pollution Control System (MGWPCS)

Permittee:	TLW Properties, LLC
Permit No.:	MTX000199
Receiving Water:	Class I Ground Water
Facility Information	
Name:	Cove Creek Ridge Subdivision
Mailing Address:	TLW Properties, LLC P.O Box 539 Big Fork, MT 59911
Contact:	Tom L. Windham
Phone:	406-837-1501
Fee Information	
Number of Outfalls:	1
Outfall - Type:	001a Zone 1 Drainfield 001b Zone 2 Drainfield

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I. Permit Status

This is a new permit for a proposed wastewater treatment system that is part of a subdivision located in Big Fork, MT. The Department received the initial permit application and supporting documents on May 8, 2007. The application was determined to be deficient on May 16, 2007 and again of January 29, 2008. The Department received responses to the deficiency letters on January 28, 2008 and August 7, 2008. A complete permit application was received and permit application was deemed complete on August 7, 2008.

II. Facility Information

A. Facility Description

Permit application materials submitted by Gateway Engineering & Surveying (GES), Inc on behalf of the Cove Creek Ridge Subdivision (CCRS) reported a maximum daily design flow of 11,200 gallons per day from a 32 dwelling unit subdivision. The wastewater treatment system includes a sequencing batch reactor (SBR), a coagulation injection system, a gravity sand filtration system, and an ultraviolet disinfection system. Residential wastewater is discharged to a 6,000 gallon distribution tank, and is then pumped to one of three SBR tanks for anaerobic/ anoxic biological treatment. In the treatment process the wastewater and biological solids mixture (mixed liquor) is alternately mixed, deprived of oxygen and is then periodically pumped to the clarification chamber where quiescent conditions allow the solids to settle. A pump transfers the settled solids back to the aeration chamber and clarified effluent is pumped to the 3,000 gallon feed tank. A portion of the mixed liquor is periodically wasted to the 8,000 gallon sludge holding tank to maintain optimal operating conditions in the treatment process. At this point chemical additions are made to the treatment system. These include methanol, sodium carbonate and poly aluminum chloride. Soda ash (sodium carbonate) will be added to the nitrification process for control of pH. Methanol will be added to the nitrification/denitrification process to provide the added source of carbon required for denitrification. Wastewater is then treated in a sand filter. Final treatment occurs in two parallel ultraviolet disinfection units. Wastewater will be then be sent to a 4,000 gallon dose tank (see attachment).

The proposed wastewater treatment facility will discharge via a two zoned drainfield. The eastern most drainfield will be deemed outfalls 001a and western most drainfield will be deemed outfall 001b. The drainfields are located on the hydraulically down gradient side of the CCRS. Outfalls 001a and 001b are situated in Flathead county at T29N, R20W, in the northeast ¼ and northwest ¼ of Section 27, or N 48º15’ 5.11” latitude and W 114º 8’ 31.92” longitude .

B. Effluent Characteristics

The wastewater treatment system is a new system therefore no effluent samples have been collected or analyzed. However, the applicant has submitted effluent data from a similar SBR system that was operated in Boise ID. Data was presented in the Environmental Technology Verification Program (ETVP) Report, published under a cooperative agreement with the U.S Environmental Protection Agency and NSF International (NSF International 2006). Effluent characteristics of similar SBR systems are listed in table 1.

Table 1 Effluent Characteristics

Parameter	Units	Mean	Maximum	Minimum
Total Suspended Solids (TSS)	mg/L	6	23	3
Biological Oxygen Demand (BOD)	mg/L	4	8	2
Total Coliform	mpn/100 ml	4	120	2^3
Total Ammonia, as N	mg/l	0.33	2.53	<0.04
Total Kjeldahl Nitrogen, as N	mg/L	1.23	3.54	0.40
Nitrate + Nitrite, as N	mg/L	3.1	8.8	0.60

Total Nitrate	mg/L	6.3	15	2.0
Total Phosphorous, as P	mg/L	1.3	2.7	0.08

III. Proposed Technology Based Effluent Limits

The Department has determined that discharge of domestic wastewater from the proposed system in a "New or Increased Source" pursuant to ARM 17.30.702 (18). As such it is subject to the Nondegradation rules of ARM 17.30.701-718. The proposed system meets the definition of level II treatment [ARM 17.30.702(11)]. A level II system must provide at least a 60 % removal of total nitrogen in raw wastewater or produce effluent with a total nitrogen concentration of 24 mg/L or less. The applicant submitted "Model 6000 SBR System influent and Effluent Nitrogen Data" (GES 2007) from a like facility, and reported a maximum Total Nitrogen concentration of 50 mg/L. If this effluent was to receive 60% reduction, a Total Nitrogen effluent concentration of 20 mg/L could be expected. This is more stringent than the 24 mg/L required in ARM 17.30.702 (11). Therefore a value of 20 mg/L will be used as a permit effluent limit. Because an additional 7% of nitrogen removal is assumed to occur within the drainfield a proposed limit of 21.4 mg/L will be used. The technology-based permit limit for total nitrogen will be set at 21.4 mg/L (see Table 1).

The proposed technology based effluent limits for outfall 001a and 001b are presented in Table 1.

Table 1. Technology Based Effluent Limit for Outfall 001a and 001b

Parameter	Concentration (mg/L) Daily Maximum (1)
Total Nitrogen as N	21.4

(1) See definitions, Part I.A of the permit

IV. Water-Quality Based Effluent Limits

A. Receiving Water

The applicant submitted ground water analytical data from six onsite monitoring wells. Ground water quality sampling was conducted from up gradient and down gradient monitoring wells. Application materials suggest the presence of a ground water divide bisecting the property. Ground Water quality sampling occurred from two up gradient wells (MW-2 and MW-4) on either side of the ground water divide (Figure 1). Sampling was conducted on February 12, 2008, May 20, 2008 and July 16, 2008. Analytical data from these sampling events is presented in table 2.

The receiving water for Outfall 001a and 001b is Class I ground water as defined by ARM 17.30.1006 (1)(a). The quality of Class I ground water must be maintained so that these waters are suitable for public and private water supplies, culinary and food processing, irrigation, commercial and industrial purposes, drinking water for livestock and wildlife. Human health standards listed in DEQ-7 (February 2006) apply to concentrations of dissolved substances in Class I ground waters with a specific conductance of less than 1,000 µmhos/cm [RM 17.30.1006(1)(a)(i)].

The average hydraulic conductivity of the aquifer is 0.67 ft/day. This estimate is derived from well tests conducted on two onsite wells (MW-4 and MW-6). These well were chosen based on their proximity to the drainfield. Rising and falling head tests (slug tests) were run on both wells, and an average of all tests was reported. The hydraulic gradient in the shallow ground water was reported as 0.00315 ft/ft, estimated from onsite monitoring wells.

Table 2. Receiving Water Ground Water Monitoring Results

Well Identification	Date Samples	Nitrate + Nitrite (mg/L)	E Coli (CFU/100ml)	Chloride (mg/L)	Total Dissolved Solids (mg/L)	Conductivity (umhos/cm)
MW-2	2/12/2008	15.6	<1	2	309	474
MW-2	5/20/2008	14.7	<1	2	302	761
MW-2	7/16/2008	15.6	<1	2	309	482
MW-4	2/12/2008	0.12	<1	1	475	763
MW-4	5/20/2008	0.08	<1	2	426	848
MW-4	7/16/2008	0.08	<1	ND	452	752

ND= Non detect

Sampling events yielded specific conductivity values of between 474 and 848 umho/cm. Therefore, the receiving water for Outfall 001 is Class I ground water as defined by the Administrative Rules of Montana [ARM 17.30.1006 (1)(a)] (ground water with specific conductance equal to or less than 1,000 micro Siemens/cm). Class I ground water is to be maintained for the following beneficial uses with little or no treatment: public and private water supplies, culinary and food processing purposes, irrigation, drinking water for livestock and wildlife and for industrial and commercial uses. Water quality human health standards (DEQ-7, February 2006) apply to concentrations of substances in Class I ground waters. Pursuant to ARM 17.30.1006(1)(b)(ii) for parameters that are not listed in DEQ-7, there shall be no increase in Class I receiving water concentrations to levels that render the water harmful, detrimental or injurious to the beneficial uses listed for Class I waters. The Department may use any credible information to determine these levels. Class I ground waters are considered high quality waters and are subject to Montana's Nondegradation Policy [75-5-303, Montana Code Annotated (MCA)].

The National Resources Conservation Service (NRCS) indicates that soils in the vicinity of the wastewater treatment system are primarily Blanchhard fine sand (0-20 inches Silt loam, 20-50 inches gravelly sandy loam, 50-60 inches Gravelly loamy sand)and Creston silt loam (0-12 inches Silt loam, 12-18 inches Clay loam, Silty clay loam and Silt loam, 18-60 inches Clay loam, Loam and Silt Loam), Half Moon silt loam (0-2 Organic materials, 2-13 inches Silt Loam, 13-33 inches Silty clay loam, 33-60 fine Sandy loam), Haskill fine sand (0-2 Organic materials, 2-12 Fine sand, 12-29 Loamy fine sand, 34-72 Fine sand) and Stryker silt loam (0-3 Organic

materials, 3-15 Silt loam, 15-25 Silty clay loam, Silt loam 25-60 fine sandy loam, silty clay loam).

Based on proximity, the nearest surface water is Blaine Lake approximately 2,500 ft east of the existing discharge location and across gradient. Blaine Creek is the outlet to Blaine Lake and runs down gradient of the system. Based on the direction of ground water flow, the nearest surface water to Outfalls 001 is also Blaine Creek approximately 4,000 feet downgradient. The ground water flow direction in the vicinity of the drainfield is approximately S76°W based on ground water table elevations measured in onsite wells.

B. Basis for Water Quality Based Effluent Limits

Water quality limitations must be established in permits to control all pollutant or pollutant parameters that are or may be discharged at a level which will cause, have reasonable potential to cause or contribute to an excursion above any state water quality standard. ARM 17.30.1005 states that the ground water standards establish the maximum allowable changes in ground water quality, are the basis for limiting discharges to ground water, and may only be exceeded within a mixing zone authorized by the department. This section develops applicable effluent limits for each POC based on the water quality standards. When possible, numeric effluent limits are expressed as loads, because this type of limit inherently regulates both the volume and strength of the effluent as prescribed at 75-5-402(3), MCA. The permittee must comply with the permit developed by the Department in accordance with the Montana Numeric Water Quality Standards included in Circular DEQ-7 (February 2006) and protection of beneficial uses (ARM 17.30.1006).

C. Nitrate

Class I ground water is considered high quality water and is subject to Montana's Nondegradation Policy 17.30 subchapter 7. The wastewater system is considered a new source as pursuant to ARM 17.30.702 (18) (a). Total nitrogen is the sum of inorganic nitrogen and organic nitrogen concentration (nitrate + nitrite as N (NO_3+NO_2-N) plus ammonia and organic nitrogen as N). The Department assumes all the nitrogen discharged to the drainfield in the effluent is converted to nitrate as nitrogen. The allowable discharge concentration is derived from the mass balance water quality equation, which considers dilution and background concentration of the receiving water (EPA, 2000).

$$C_2 = \frac{C_3(Q_1 + Q_2) - C_1 Q_1}{Q_2}$$

C_1= ambient ground water (background) concentration, mg/L
C_2 = allowable discharge concentration, mg/*L*
C_3 = ground water concentration limit for pollutant (from Circular DEQ-7 February 2006 or other appropriate water quality standard) at the end of the mixing zone.
Q_1 = ground water volume (ft^3 / day)
Q_2 = maximum flow of discharge (design capacity of system in ft^3 / day)

The volume of ground water that will mix with the discharge (Q_s) is estimated using Darcy's equation: $Q_1 = K\ I\ A$.

Where: Q_1 = ground water flow volume (ft^3/day)
K = hydraulic conductivity (ft/day)
I = hydraulic gradient (ft/ft)
A = cross-sectional area (ft^2) of flow at the down-gradient boundary of a standard 500-foot mixing zone.

$$(Q_{1\text{-}001}) = (0.67\ ft/day)(0.0031\ ft/ft)(4{,}500\ ft^2)$$

$$Q_{1\text{-}001} = 9.0\ ft^3/day$$

The design capacity of the entire wastewater disposal system is 11,200 gpd, or 1,497 ft^3/day. Hydraulic conductivity (K) of the alluvium is estimated at 0.67 feet per day (ft/d). The gradient was calculated based on well data from wells surrounding the site, at 0.0031 ft/ft. The area (A) is calculated by the width of the source perpendicular to the ground water flow direction, times a standard mixing zone depth in the ground water of 15 feet. The applicable water quality standard for nitrogen of 7.5 mg/L will be used in the mass balance equation. This value was used because the discharge form this system is subject to the nondegradation rules of 17.30.701-718 and discharges to high quality waters as defined in 75-5-103 (10) and 17.30.702 (8). The permit application indicated an average Nitrate plus Nitrite concentration of 15.3 mg/L for ambient ground water quality from MW-2. Therefore a concentration of nitrate (as N) of 15.3 mg/L was used in calculating the allowable nitrogen concentration at the end of the mixing zone. It is assumed that the entire total nitrogen load in the seepage effluent converts to nitrate and enters the ground water.

$$C_2 = \frac{7.5\ mg/L\ (9.0\ ft^3/day + 1{,}497\ ft^3/day) - (15.3\ mg/L)\ (9.0\ ft^3/day)}{(1{,}497\ ft^3/day)}$$

$$= 7.5\ mg/L$$

The projected daily maximum concentration of the total nitrogen in the effluent discharged to ground water must not exceed 7.5 mg/L at Outfall 001a and 001b. The Department assumes an additional 7% nitrogen removal occurs within the drainfield providing a final total nitrogen concentration discharged to ground water of 8.0 mg/L. These effluent limits ensure the nitrate plus nitrite (as N) concentration at the end of the ground water mixing zones are at or below the nondegradation criterion of 7.5 mg/L.

D. Phosphorus

Phosphorus is removed mainly through soil sorption processes, which vary based on soil composition. The 50-year breakthrough nondegradation criterion is based on the amount of soil available to adsorb the average load of phosphorus from the wastewater source, between the discharge point and the closest downgradient surface water. The total phosphorus limitations are imposed to ensure that the quality of the effluent meets the nondegradation limit prior to discharge into any surface water [ARM 17.30.715(1)(e)]. The effluent limits do not include a concentration limit for phosphorus because of the method used to determine compliance with the

50-year breakthrough criteria. Phosphorous breakthrough analysis calculations are mass based, therefore the limit will be a load based discharge limit.

Conducting a phosphorous breakthrough analysis of each drainfield is a less conservative means of calculating the effects of phosphorous to state waters. Due to the proximity and similar orientation of the drainfields the Department assumes both drainfields are one for the purpose of calculating phosphorous breakthrough. Using the distance to surface water (Blaine Creek) approximately 4,000 feet southwest and down gradient of the proposed drainfields the breakthrough time for phosphorus is 73.1 years. This breakthrough time is considered nonsignificant pursuant to Montana's Nondegradation criteria [ARM 17.30.715(1)(e)].

A phosphorous breakthrough would occur in 50 years (the level of significant degradation) at an effluent concentration of 10.5 mg/ L and load of 0.98 lbs/day or 358 lbs/year. Therefore the effluent limit for the Total Phosphorous load discharged to the drainfield shall not exceed 0.98 lbs/day or 358 lbs/year for Outfall 001a and 001b. The water quality based effluent limit for each outfall will therefore be set at 0.98 lb/day.

E. Escherichia Coli

A wastewater treatment system that is appropriately sited and operating properly should remove most if not all of the pathogenic bacterial indicators within 2 to 3 feet of the drainfields infiltrative surface (USEPA, 2002). An Escherichia Coli (E coli) limit has not been established in this permit due to the following site-specific criteria:

- The drainfield is pressured-dosed, which minimizes saturated conditions and therefore maximizes the die-off rate in natural sediments.
- The wastewater treatment system incorporates ultraviolet disinfection of effluent, which is capable of removing %99 of pathogens (GES 2008).
- The permittee is required to meet the E Coli ground water standard of less than 1 organisms/100 ml wastewater at the end of the mixing zone.

The systematic dosing of the drainfield and the soil matrix of the drainfield provide natural disinfection, which will enable the DEQ-7 human health standard of <1 organism/100 ml to be achieved in the ground water. Pathogen transport research indicates a 3-log decrease in pathogens for every meter of horizontal movement through the vadose zone and a 6-log decrease in pathogen transport for every 20 m in vertical transport through the saturated zone (Woessner, 1998). The proposed system discharges the effluent about 3 m above the ground water; additional treatment will occur prior to reaching the water table. A 3-log removal in the vadose zone indicates less than 1 colony per 100 ml within 3-feet of the discharge. The existing system incorporates disinfection in the wastewater treatment system. A mixing zone will not be granted for pathogens.

The proposed water quality and nondegradation effluent limits for outfall 001a and 001b are presented in Table 3.

Table 3. Water-Quality Based Effluent and Nondegradation Limits Outfall 001a and 001b

Parameter	Concentration (mg/L) Daily Maximum (1)	90 Day Average Load (2) (lbs/ per day)
Total Nitrogen as N	8.0	0.75
Total Phosphorus as P	10.5	0.98

(1) See definitions, Part I.A of the permit
(2) load calculation: lb/d = (mg/L) x flow (gpd) x 8.34 x 10^{-6}

F. Mixing Zone

The permittee has proposed to discharge all wastewater from Outfalls 001a and 001b to ground water. Ground water in the immediate vicinity of the discharge is classified as class I water as defined by ARM 17.30.1006 (1)(a) and discussed in Section IV A of this document. The permittee did not request a source specific or standard 500-foot ground water mixing zone for outfall 001a or 001b. Information submitted with the permit application regarding performance standards of the wastewater treatment system indicated that effluent will be treated to below water quality standards prior to discharge. A ground water mixing zone will not be granted for any parameter.

V. Final Effluent Limits

The proposed final effluent limitations for Outfall 001a and 001b are summarized in Table 4 and are based on water quality, nondegradation significance water quality criteria and the water quality standards of DEQ-7 discussed in previous sections. Class I ground water is to be maintained for the following beneficial uses with little or no treatment: public and private water supplies, culinary and food processing purposes, irrigation, drinking water for livestock and wildlife and for industrial and commercial uses. Water quality human health standards (DEQ-7, February 2006) apply to concentrations of substances in Class I ground waters. Pursuant to 75-5-402 (3), ARM 17.30.1031(2) and ARM 17.30.1006 (1)(a) the Department will implement limits such that the discharge from outfall 001 shall not cause increase of a parameter to a level that renders the water harmful, detrimental or injurious to the beneficial uses listed for class I water.

Permit application materials received by the Department in January 28, 2008 indicated that the applicant is not requesting a mixing zone. As such the permittee will be required to meet the ground water quality standard for nitrogen (7.5 mg/L) at the point of last control prior to discharge to ground water. The permittee submitted technical information indicating a design capacity of 11,200 gpd. The design flow is the peak flow (daily or instantaneous) for sizing treatment facilities, such as pumps, piping, storage and adsorption systems and means the average daily flow for sizing the treatment system. Flows in exceedance of the design flow would not be expected to be treated adequately by the system. The combined flow limit from outfalls 001a and 001b shall not exceed the design capacity of 11,200 gpd based on the daily average.

Table 4. Final Numeric Effluent Limits for Outfall 001a and 001b

Parameter	Concentration (mg/L) Daily Maximum (1)	90 Day Average Load (2) (lbs/ per day)
Total Nitrogen as N	7.5	0.7
Total Phosphorus as P	Total Phosphorus as P	10.5

(1) See definitions, Part I.A of the permit
(2) 90 day average load calculation: lb/d = (mg/L) x flow (gpd) x 8.34 x 10^{-6}
NA = Not Applicable

Effluent monitoring is required to ensure the effective treatment and consistency of the wastewater discharged from the facility. Effluent limits are established to protect the ground water from a change in water quality that would cause degradation [ARM 17.30.715] or limit a beneficial use [ARM 17.30.1006(1)(a)]. Samples or measurements shall be representative of the volume and nature of the monitored discharge. Water quality monitoring of the effluent shall occur from the dosing tank prior to discharge into the drainfields. The effluent flow measurement method shall be either by flow meter and recorder or a totalizing flow meter; dose counts or pump run-times will not be accepted. The permittee shall monitor the flow of the effluent continuously and report the daily maximum, average daily and the 30 day average in gallons per day. To ensure that the Total phosphorous load is calculated correctly, an accurate average daily flow must be measured. The average daily flow shall be measured when required sampling is conducted (flow measurement must correspond to sample collection to calculate an accurate load).

The permittee shall monitor the effluent for the constituents in Table 5 at the frequency and with the type of measurement indicated. If no discharge occurs during the entire monitoring period, it shall be stated in a Discharge Monitoring Report that no discharge occurred.

Table 5. Outfall 001a and 001b Parameters Monitored Prior to Discharge to the Drainfield

Parameter	Frequency	Sample Type (1)
Effluent Flow Rate, gpd (2) (3)	Daily (1)	Continuous (1)
Biological Oxygen Demand (BOD_5), mg/L	Quarterly	Composite
Total Kjeldahl Nitrogen (TKN), mg/L	Quarterly	Composite
Nitrate, mg/L	Quarterly	Composite
Nitrite, mg/L	Quarterly	Composite
NO_3+NO_2 as N, mg/L	Quarterly	Composite
Ammonia, as N, mg/L	Quarterly	Composite
Total Phosphorus (as P), mg/L	Quarterly	Composite
Total Suspended Solids (TSS) mg/L	Quarterly	Composite
Total Nitrogen (as N), mg/L	Quarterly	Calculated
Total Nitrogen (as N), lb/d	Quarterly	Calculated
Total Phosphorus (as P), lb/d	Quarterly	Calculated
Chloride, mg/L	Quarterly	Composite

(1) See definitions, Part I.A of the permit
(2) If no discharge occurs during the reporting period, "no discharge" shall be recorded on the DMR report form
(3) Permittee is to report the daily maximum and 30 day average

A. Ground Water Monitoring

Ground water monitoring will be required in this permit due to the following site-specific criteria:

- This area is experiencing rapid growth and development.
- Proximity of the water table to the surface (approximately 12 ft below the surface).
- The shallow aquifer is a coarse grained alluvial aquifer with a relatively high hydraulic conductivity.
- The need to distinguish the effects to ground water of the discharging wastewater treatment system.
- The presence of a high quality receiving water and the need to ensure that existing and future beneficial uses are protected.

The permittee will be required to monitor the ground water quality on the down gradient edge of the CCRS property. Therefore one monitoring well shall be installed on the down gradient side of outfalls 001a and 001b on the property line of the CCRS property. This well shall be identified as CP-1. This well shall serve as a monitoring point for determination of exceedances of the ground water quality standards. This shall be screened from the top of the high water table to 15 feet below the low water table. The permittee will conduct quarterly monitoring for the parameters listed in Table 6.

Table 6. Monitoring Parameters for Monitoring Wells: CP-1

Parameter	Frequency	Sample Type (1)
Static Water Level (SWL) (feet below the casing top)	Quarterly	Instantaneous
Specific Conductance, µmhos/cm	Quarterly	Grab
Chloride, mg/L	Quarterly	Grab
Escherichia Coli (Organisms/100 m*l*)	Quarterly	Grab
Total Ammonia, as N, mg/L	Quarterly	Grab
Nitrate, mg/L	Quarterly	Grab
Nitrite, mg/L	Quarterly	Grab
NO_3+NO_2 as N, mg/L	Quarterly	Grab
Total Phosphorous	Quarterly	Grab

(1) See definitions, Part I.A of this permit

VI. Significance Determination

The Department has determined that the discharge constitutes a new or increased source and is subject to Montana Nondegradation Policy (75-5-303, MCA; M 17.30.702(16)). The Department has determined this discharge to be nonsignificant with respect to nitrogen concentrations discharged to state waters. Nitrogen concentrations are required to be 7.5 mg/L or less prior to discharge. Phosphorus load limits are based on nondegradation significance criteria for 50-year break-through to surface water in accordance with ARM 17.30.715(1)(e) (DEQ

phosphorous break through analysis 2008). Therefore, discharge in compliance with the limitations of this permit constitutes nonsignificant degradation.

VII. Special Conditions/Compliance Schedules

a) Effluent Flow Measurement

The permit for the CCRS will require effluent flow monitoring. To ensure that the Total phosphorous load is calculated correctly, an accurate average daily flow must be measured. The Department requires that samples or measurements be representative of the volume and nature of the monitored discharge. Effluent flow shall be monitored following treatment in the SBR's and prior to discharge into the drainfield. The measurement method shall be either by recorder or a totalizing flow meter dose counts or pump run-times will not be accepted. The permittee shall monitor the flow of the effluent continuously. The permittee shall install the above mentioned flow monitoring equipment prior to discharge of wastewater to state waters.

b) Monitoring Well Installation

Within 90 days of the effective date of the permit the permittee shall submit to the Department for approval a plan for ground water monitoring well installation as well as a brief summary of a monitoring, sampling and analysis plan for monitoring wells installed onsite. The plan shall include the location, conceptual design and construction methods of the planned ground water monitoring wells, and the monitoring, sampling and analysis methods that will be used to meet the monitoring required in the permit. The well shall be located on the property line of the CCRS property in the centerline of the drainfields (outfall 001a and 001b).

Prior to discharge the permittee shall submit to the Department a brief report or letter documenting the results of the monitoring well installation including the final location of the installed monitoring well, construction details for the well and a report on ground water quality in the from the well. Ground water quality analysis shall include those parameters listed in Table 6. Ground water quality monitoring shall begin upon installation of the well and continue though the duration of the permit.

IX. Information Source

In the development of the effluent limitations, monitoring requirements and special conditions for the draft permit, the following information sources were used to establish the basis of the draft permit and are hereby referenced:

ARM Title 17, Chapter 30, Sub-chapter 7 - Nondegradation of Water Quality, March 2000.

ARM Title 17, Chapter 30, Sub-chapter 10 - Montana Ground Water Pollution Control System (MGWPCS), March 2002

Environmental Protection Agency, U.S. EPA NPDES Permit Writers Manual, December 1996

Environmental Protection Agency, U.S. EPA Wastewater Technology Fact Sheet, Package Plants, EPA 832-F-00-016 September 2000.

Environmental Protection Agency, Design Manual: Onsite Wastewater Treatment System Manual. EPA 625/R-00/008, 2002.

Fetter, C.W., Applied Hydrogeology., 1988

Gateway Engineering and Surveying Inc, Montana Ground Water Pollution Control System Permit Application., 2007 and supplemental application materials submitted 2008

NSF International, Environmental Protection Agency, Environmental Technology Verification Report., EPA/600/R-06/130. 2006.

Regensburger, E. Nutrient-Reducing Wastewater Treatment System Designation Form. Montana Department of Environmental Quality. 2004

Woessner, W., Thomas, Troy., Ball, Pat and DeBorde, Dan C., (April 1998), Virus Transport in the Capture Zone of a Well Penetrating a High Hydraulic Conductivity Aquifer Containing a Preferential Flow Zone: Challenges to Natural Disinfection. , University of Montana., Missoula, Montana.

United States Department of Agriculture, Natural Resource Conversation Service, http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx .

Prepared By: Louis Volpe August 22, 2008